Mumps

CLINICAL CASE DEFINITION

An illness with acute onset of unilateral or bilateral tender, self-limited swelling of the parotid and/or other salivary gland(s), lasting at least 2 days, and without other apparent cause.

Clinically compatible Illness
Infection with mumps virus may present as aseptic meningitis, encephalitis, hearing loss, orchitis, oophoritis, parotitis or other salivary gland swelling, mastitis or pancreatitis.

CASE CLASSIFICATION

- **Suspected:** A case with clinically compatible illness or that meets the clinical case definition without laboratory testing, or a case with laboratory tests suggestive of mumps without clinical information.

- **Probable:** A case that meets the clinical case definition without laboratory confirmation and is epidemiologically linked to a clinically compatible case (i.e., meets clinical case definition or has clinically compatible illness).

- **Confirmed:** A case that: 1) meets the clinical case definition or has clinically compatible illness, and 2) is either laboratory confirmed or is epidemiologically linked to a confirmed case.

Comments:

- With previous contact with mumps virus either through vaccination (particularly with 2 doses) or natural infection, serum mumps IgM test results may be negative; IgG test results may be positive at initial blood draw and viral detection in RT-PCR or culture may have low yield. Therefore, mumps cases should not necessarily be ruled out by negative laboratory results. Serologic tests should be interpreted with caution, as false positive and false negative results are possible with mumps IgM tests.

- False-positive mumps IgM results by immunofluorescent antibody assays have been reported.
- Influenza, parainfluenza type 3, and cytomegalovirus (CMV) can also cause parotitis. There are also other non-infectious causes of parotitis.

TRANSMISSION

Person to person via airborne transmission or direct contact with infected droplet nuclei or saliva.

INCUBATION PERIOD

16 – 18 days, range 14 -25 days. See Mumps Timeline, below

PERIOD OF COMMUNICABILITY

Possibly 7 days before symptom onset to possibly 9 days after; most likely 3 days before to 5 days after.

REPORTING/INVESTIGATION

Health care providers should **immediately** report cases and possible cases of mumps to local health department serving the residence of the case.

Local health department role/responsibilities:

- Contact case/guardian and health care provider.
- Investigate and determine if case meets clinical case definition.
- Control measures (below) are recommended for Confirmed and Probable cases (reports meeting the Suspected classification warrant additional watchfulness and community surveillance for additional possible cases).
- Assist with coordination of specimen collection and coordination if public health lab resources (MDCH, CDC, etc) are used.
- Report/ensure reporting of case to the Michigan Disease Surveillance System (MDSS). CDC Mumps Surveillance Worksheet CDC Mumps Surveillance Worksheet may be helpful in field investigation to collect and capture data. Obtain immunization history information from provider record or MI Care Improvement Registry (MCIR - state immunization registry).
- Update the MDSS record in a timely manner with new or additional info as it becomes available. Finalize MDSS record when case investigation is complete.
- In the event of death, obtain and send copies of hospital discharge summary, death certificate, and autopsy report to MDCH Immunization Division.

LABORATORY CONFIRMATION

Lab confirmation of mumps cases is strongly recommended and should be attempted for all potential cases meeting the clinical case definition. Laboratory confirmation for mumps is defined as one or more of the following:

- Positive serologic test for mumps IgM antibody.
- Significant rise between acute-and convalescent-phase titers in serum mumps IgG antibody level by any standard serologic assay.
- Isolation of mumps virus from a clinical specimen (e.g. buccal mucosal swabs, throat swabs, oral fluid; urine).-
- Detection of mumps nucleic acid (RNA) standard or real-time reverse transcription polymerase chain reaction (RT-PCR).

See additional information under LABORATORY SPECIMENS: PROCEDURES AND CONSIDERATIONS, below.

Mumps testing is available through the MDCH laboratory but must be approved. Pre-approval arrangements must be made through the MDCH VPD Surveillance Coordinator at 517-335-8159.

MDCH lab offers mumps viral culture, mumps PCR, and IgG serologic testing (note: for diagnostic/case confirmation purposes, IgG tests require paired serum specimens collected from the acute and convalescent phases of illness). Mumps IgM serology is available at CDC through MDCH.

Mumps testing (serologic and virologic) is also available through commercial clinical laboratories.

IMMUNITY/SUSCEPTIBILITY

Individuals should be considered immune (protected against) mumps only if they meet one or more of the following conditions:

- Born before 1957
- Have documentation of a history of mumps disease as diagnosed by a physician
- Serologic (laboratory) evidence of immunity to mumps
    - Though there are no data that correlate levels of serum antibody with protection from disease, presence of mumps specific IgG antibodies can be considered evidence of mumps immunity.
- Documentation of adequate immunization, now defined as
    - 1 dose of a live mumps virus vaccine for preschool-aged children and adults not at high risk of exposure to mumps;
    - 2 doses for school-aged children (i.e., grades K--12) and for adults at high risk (i.e., health-care workers, international travelers, and students at post-high school educational institutions).

NOTE: All persons who work in medical facilities should have evidence of immunity to measles, mumps, rubella, and varicella

CONTROL MEASURES

Investigate reports of suspected, probable, and confirmed mumps cases **immediately**.

For a sporadic case meeting the Suspected classification, a minimum response consisting of increased surveillance for additional cases in the setting (e.g. school) and/or general community is recommended.

For any case(s) meeting the Probable or Confirmed classification, the following public health measures are recommended:

- Enhance surveillance in the affected setting and community.
- Exclude and isolate cases and any possible cases from group activity settings (e.g. schools, day-care centers, work places, camps) until 5 days after onset of parotitis, or until ruled-out by physician or serologic/other testing. Instruct cases to avoid exposing other persons, especially persons or groups thought to be susceptible to mumps. In health care settings, use of Droplet Precautions is recommended.
- Persons exposed to the case in group-activity settings (e.g. schools, day-care centers, work place, camps) who cannot readily provide documentation of mumps immunity should be vaccinated or excluded from the setting.
- Exclusion should continue until 25 days after the onset of parotitis in the last person with mumps in the affected setting/institution.
- Once vaccinated, susceptible persons may be re-admitted to the activity setting/institution. If this

is the first dose of mumps-containing vaccine, a 2nd dose should be scheduled (not earlier than 28 days after the first dose).

- Mumps vaccine should be administered to susceptible persons. Although mumps vaccination has not been shown to be effective in preventing mumps in persons already infected, it will prevent infection resulting from subsequent exposure. Susceptible persons vaccinated early in the course of an outbreak may be protected. However, cases may be expected to continue to occur among newly vaccinated persons since they may have been vaccinated after already being exposed and infected.

- Provide information about mumps to persons at risk and/or the general public. An excellent Question-&-Answer mumps information sheet in **.PDF** format is available from the Immunization Action Coalition.

- Based on data showing a 2 dose schedule of mumps (MMR) vaccine is more effective than one dose for preventing mumps, in outbreaks a 2nd dose of MMR is recommended for the following groups:
  - Health care workers
  - School-aged children
  - Students at post-high school educational institutions
  - Other age groups considered at high risk of exposure

LABORATORY SPECIMENS: PROCEDURES AND CONSIDERATIONS

Traditionally, serology has been the means of case confirmation. Virology methods are also available to characterize the molecular epidemiology of circulating mumps virus strains and are recommended in addition to serologic tests.

Specimens for both serology and virology (culture and/or PCR) testing should be collected from suspected cases. Recommendations for mumps diagnostic testing are as follows:

- **Obtain serum within 5 days of onset to test for mumps IgM antibody.**
- **Obtain a swab of the buccal mucosa near the parotid duct (or other affected salivary duct gland).**
- **If the mumps IgM antibody titer is negative, mumps IgM should be repeated on a second (convalescent) serum specimen obtained 2 – 3 weeks after the onset of illness.**
- **Acute/convalescent paired serum specimens can also be used to detect a significant rise in the level of mumps IgG antibody.**

Note: In previously vaccinated persons, the mumps IgM antibody response is variable and therefore may not be detectable (due to either absent, delayed, or transient mumps IgM response); various data suggest the mumps IgM may be negative in up to 50-60% of acute serum samples among patients who have been previously immunized. Therefore, the mumps diagnosis should not necessarily be ruled out in a previously vaccinated person on the basis of a negative IgM test. Moreover, IgG antibodies may rise very quickly, masking a detectable rise. In previously vaccinated persons, if the mumps IgM is negative, consideration should be given to repeating it in a later specimen collected approximately 2 -3 weeks after onset of swelling or illness.

MUMPS SEROLOGY

Additional MDCH lab info available at
http://www.michigan.gov/documents/LSGMumps_Virus_Antibody_Determination_8371_7.doc

Purpose: to confirm a case of mumps.

Specimen needed: serum, 2 ml.

MDCH lab kit: unit 8

Specimen container: plastic serum tube with skirted cap

MDCH lab form: **DCH-0583** (formerly FB 200)

Serum specimen collection/submission procedure:

- Collect at least 5 mL of whole blood in red-top or other tube without anticoagulant. Separate serum from blood by centrifugation and pour into PLASTIC serum tube, store at 2 - 8°C, or freeze serum if it cannot be shipped and received in lab within 3 days. Do not freeze whole blood.

- Timing of specimen collection
  - **For IgM testing**:
    - **Previously unvaccinated**: best to collect serum 3-5 days after onset, but can be up to 30 days after.
    - **Previously vaccinated**: collect 3-5 days after onset, if negative consider repeating IgM 2-3 weeks after onset.
  - **For paired IgG testing**:
    - acute-phase specimen - collect as soon after mumps illness onset as possible;
    - convalescent-phase specimen - collect 2-3 weeks (no earlier than 10 days) after collecting acute-phase specimen.

    Note: Test will be done when both specimens are received (specimens can be sent individually or acute can be held at 2 - 8°C and sent to lab with convalescent specimen). If the specimens are sent to MDCH lab separately, be sure to indicate on the Lab Request form that this is an acute serum and that the convalescent specimen will follow.

- Label tube with patient name, date of birth, and date of specimen collection.

- Complete MDCH Virology Test Requisition (form DCH-0583); complete all information in the Patient Information and Specimen Information sections; write in “Mumps IgM” in the “Other – Specify Test Code/Name” area.

- Be sure MDCH Immunization Division has been notified of the case investigation; prior MDCH approval is required.

- Ship specimens on a cold pack by overnight delivery.

- Mail specimens to:

  Michigan Department of Community Health
  Bureau of Laboratories DASH Unit
  3350 N. Martin Luther King Blvd.
  Building 44, Room 155
  Lansing, MI 48909

MUMPS VIROLOGY/MOLECULAR EPIDEMIOLOGY STUDIES

Additional MDCH lab info available at
http://www.michigan.gov//documents/mdch/Mumps_PCR_LSG_180356_7.doc

Purpose:

To confirm cases and/or help determine the geographic origin of the virus and the viral strains circulating in the U.S. Virus isolates and PCR results are important for molecular epidemiologic surveillance.

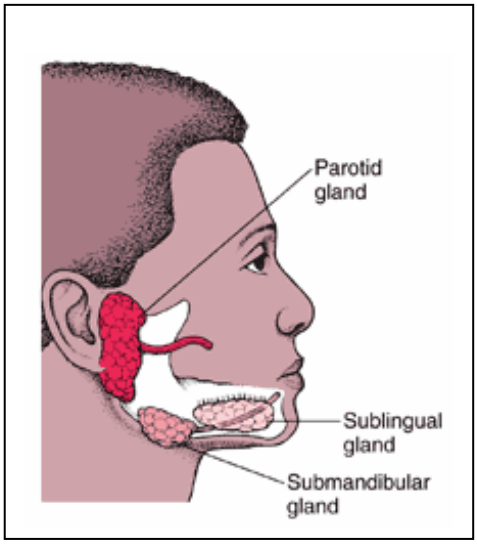
Specimens:

Buccal mucosal swabs are preferred. Use only Dacron-tipped swabs with an aluminum or plastic shaft.

Viral specimen collection/submission procedure:

- Collect buccal swab up to 9 days after symptom onset
  - Swab of buccal mucosa is preferred. Use Dacron-tipped swabs with an aluminum or plastic shaft.
  - Procedure: Massage parotid area of external cheek for 30 seconds prior to swabbing the buccal mucosa, i.e. the space between the inside of cheek and the upper molar teeth. The parotid duct (Stensen's duct) drains in this space near the upper rear molars.

Location the Major Salivary Glands



  - Throat (oropharyngeal) or nasopharyngeal swabs are alternatives.
  - Place swab in a tube containing 2-3 mls of viral transport medium or other sterile isotonic solution (phosphate buffered saline or cell culture medium). Leave swab in tube (cut or break off swab stem if necessary to fit). Be sure to tighten tube cap.

- Label all specimen containers used with patient name, date of birth, and date of specimen collection.

- Complete a MDCH Virology Test Requisition (form DCH-0583, formerly FB 200) for each specimen submitted; complete all information in the Patient Information and Specimen Information sections. Enter "Mumps PCR 2983" in the "Other – Specify Test Code/Name" area.

- Send on cold pack via overnight courier to MDCH lab

- Mail specimens to:

Michigan Department of Community Health
Bureau of Laboratories DASH Unit
3350 N. Martin Luther King Blvd.
Building 44, Room 155
Lansing, MI 48909

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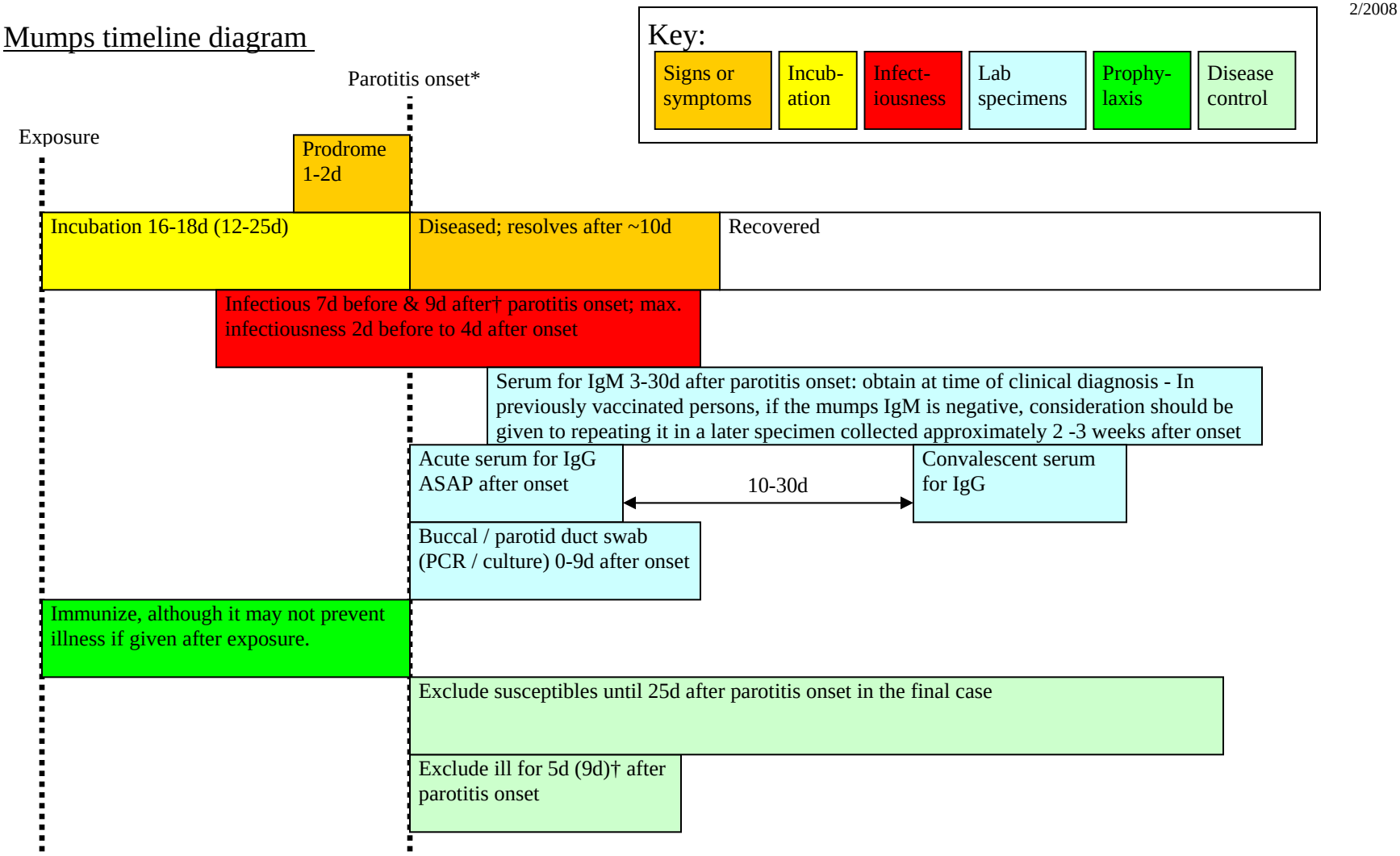
Mumps timeline diagram



* Up to 60% of mumps cases may lack parotitis. Such cases can still transmit disease. All references to 'onset' above are to parotitis onset. If the case lacked parotitis, use onset of other symptoms (e.g., fever, malaise).

† Until recently, 9d was the exclusion period; this changed following the 2006 mumps epidemic in the US Midwest.

Sources: Control of Communicable Diseases Manual, Red Book, Pink Book, MI VPD Investigation Guidelines, CDC VPD surveillance manual